

Zengamina Mini Hydro Scheme (GS355)
Internal Verification

This document is the outcome of the Gold Standard Internal Verification process for the first Monitoring Period

Information on the request:

Requested by: ClimateCare J.P. Morgan
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Date of request: 29 January 2010 (date documents were uploaded)
Date of final feedback: 29 July 2010

Crediting period claimed: 14 July 2007 to 30 June 2010

Amount of VERs claimed: 1,064 VERs

Document(s) provided and reviewed

- Monitoring Report: Zengamina Mini Hydro Scheme, 14th July 2007 to 30th June 2010

Project summary:

The project is generating renewable energy by a mini-hydroelectric power plant, replacing diesel electric plants at the Kalene Hills hospital, Hillwood farm and Sakeji School and providing electricity to previously unserved areas to include schools, clinics and commercial/industrial entities. The project is a run-of-river hydroelectric power plant of 700KW installed capacity consisting of low head weir (restraining wall for water), 300 metre canal (to channel water to the headpond), head pond (for settling the water to remove silt and debris and channels it into a 1.6 metre diameter penstock), 75 metre penstock and power house, and it is located in Zambia, North Western Province, Mwinilunga district - Kalene Mission, situated 1000 km from the capital city Lusaka.

The project is delivering tangible benefits to sustainable development such as improving access to energy services and increasing of the number of employment in the region.

Comment/Request 1: <i>Project Description</i>
Please provide more detailed information on the project description in Section 1 of the Monitoring Report, such as installed capacity, technical specifications and location of hydro plant in GPS coordinates.
Response by Project Proponent (round 1):
Zengamina Mini-hydro Scheme is a 700KW project which is located at Kalene Hills, North-Western province at a site known historically as the Zambezi Rapids. The project proponent is North West Development Trust. The project site is situated 1000 km from the capital city Lusaka with exact location as 11° 07' 26.27"S, 24° 11' 40.76"E. The Zambezi is a small river at the location where the project is situated and the river flows along granite dome, falling about 17meters over about 300 m length of rapids. The fall provided suitable slope which supported the development of a mini hydro electric project. The rapids were chosen since the river drops 5.4metres over the 300metre distance, and the water pressure "head" is used to operate a small turbine. The project is a run of river project with the following technical specifications: ▪ Weir of 1.5m height ▪ Canal (1.2m deep x 7.5m wide, 350m long) ▪ Penstock (1.9m diameter x 75m long) ▪ Tailrace (10.5m wide, water re-enters river at 1.5 m/s) ▪ Use cross-flow turbine ▪ 400v/33 kV Step-up Transformer ▪ 35 km 33 kV line is expected to be constructed
Response by GS (round 1):
This information should actually be provided in section 1 of the Monitoring Report itself. Request closed. <u>Forward Action Request</u> : please upload a revised version of the Monitoring Report with this information above included in section 1.

Comment/Request 2: <i>Monitoring Data – Meters</i>
According to the Monitoring Report p3, the total output of the generator was first monitored by the 'first' Woodward MFR 1 meter, and the total kWh on this meter from the starting date of operation, 14 July 2007, until 18 November 2009 at 16.05 was 636,510 kWh. However, since this meter was damaged by a lightning strike on 1 October 2007, it seems that a 'second' Woodward MFR 1 meter was installed on 23 October 2007. The reading on the 'second' Woodward MFR 1 meter was never taken on the day it was installed. Firstly, please clarify whether the above understanding is correct. Secondly, kindly revise the Monitoring Report and provide a clearer explanation for the various meters used (provide some kind of identification for easier referencing), when they were installed, whether there was one Woodward MFR 1 meter which was repaired or two, and from which meter the amount 636,510 kWh was taken and what this figure represents.
Response by Project Proponent (round 1):

The first MFR1 meter was installed in 14th July 2007 and by 14th September 2007, its reading was 37,377kWh and by 25th September 2007 the readings were 44,746 kWh. On 1st October 2007, the MFR1 was destroyed by lightning and there was no reading up until a new MFR1 meter was installed on 29th April 2008.

By 28th November 2008, the reading from the new MFR1 meter was 175,486 kWh. On 8th December 2009 this meter too was also destroyed by lightning and up to now, it has not been replaced and by the time it was destroyed, its readings had not been done.

The Iskraemeco meter was installed on 18th November 2009 and by 30th June 2010, its readings were 665,830 kWh.

The data show on meter readings for MFR1 meters was obtained from record books entries.

An excel sheet showing these steps is attached.

Response by GS (round 1):

Request closed.

Comment/Request 3: *Monitoring – Missing Data*

As per the Monitoring Plan in the registered PDD, 'EG_y – Net electrical output' will be monitored continuously in order to calculate emission reductions. Since this value is not available for a significant part of the monitoring period, further clarification is required to assess this deviation.

The Monitoring Report p4 describes that an average of 736.9 kWh/day calculated from the monitored values for 10 days (from 15-25 September 2007) was used to estimate the power consumption during the period from 14 July 2007 (start of operation) to 18 November 2008 (date when the new Iskraemeco MT831 meter was installed).

Please clarify if the measurements recorded in these 10 days come from the 'first' Woodward MFR 1 meter? Furthermore, please also explain whether this 10-day average can be considered representative and conservative, e.g. did the number of connections remain stable or increase after this date? And since the Monitoring Report mentions that this is "power consumption", please clarify whether this figure represents net electricity output and whether auxiliary consumption has been considered.

In addition, please clarify whether the electricity is sold to any intermediaries (e.g. local distribution companies). If yes, please provide electricity bills to enable cross-checking of claimed electricity generation.

Response by Project Proponent (round 1):

As outlined in the monitoring report, the 736.9 kWh/day was chosen because during this period, there were no new connection and the consumption was assumed to be stable. Although the number of connections increased after this date, their average consumption applied is the value obtained during the 10 day period. These are the only records

available before the new Woodward MFR 1 meter of the same make was installed. The project proponent therefore has no choice of any other data available to use in getting an average other than the one in the record books for that 10 day window period.

The Iskraemeco MT831 was installed on 18th Nov 2009 and this is the meter which has been recording the meter consumption in the grid till date. The meter records the grid consumption i.e. after auxiliary consumption. The figures therefore being recorded does not contain power used for auxiliaries, this is clearly explained in the report, *"From the November 18th 2008 recording of the total power consumes on the grid was accomplished by an Iskraemeco MT831, 3 phase multifunction meter. This meter measures the power being used on the grid, through three pairs of current and voltage transformers (one on each phase), located in the Hydro substation"*.

The project location and size does not involve sale of electricity to other distribution companies in the area or country.

The monitoring report has been updated.

Response by GS (round 1):

Request closed.

Comment/Request 4: Monitoring Data – Spreadsheet

Please submit an Excel spreadsheet with the detailed records of monitored (or calculated) data, broken down into daily or monthly values, to enable easier verification and understanding of the figures applied. For the dates when no monitored data is available, please fill the spreadsheet with the calculated values and mark these dates accordingly.

Also, since the Gold Standard issues credits by vintage, please also provide sub-totals for emission reductions by calendar year in both the Excel spreadsheet and in the Monitoring Report.

Response by Project Proponent (round 1):

Due to logistical and other events beyond the project proponent's control, a continuous monitoring of meter reading has not been done. However, the project proponent has only managed to do a periodic meter reading.

A detailed spreadsheet showing all the calculation steps and yearly vintages is attached.

Response by GS (round 1):

Request closed. Forward Action Request: in the next Monitoring Report, please provide monthly readings of the meters as per Monitoring Plan.

Comment/Request 5: SD Indicator, Employment numbers

The Monitoring Report p6 mentions that 10 full time and 4 part time employments have been created by the project and also other casuals are employed on an "as needed" basis to assist in line erection of new MV and HV lines. The PP estimates that for the

year 2009, employment of part time labour was more than 25,000 man hours. Please submit documentary evidences for the number of jobs created for the entire crediting period. In the PDD p25, the Monitoring Plan mentions: <i>"It is projected that several new jobs will be created, including 10 full time and around 40 casual staff. Staff numbers are maintained on the company books, which will be used in the monitoring of this indicator."</i> If these books are available, please submit as proof.
Response by Project Proponent (round 1):
The project has so far created 10 permanent jobs and several casual jobs. Tax return attached as proof of employment creation.
Response by GS (round 1):
Request closed.

Comment/Request 6: SD Indicator, Livelihood of the poor
The Monitoring Report mentions that it is too early to assess the impacts of the hydro plant on the community at this early stage. The Monitoring Plan in the PDD p25 mentions that <i>"Qualitative stakeholder assessment will be used to assess impacts on poverty alleviation. This will include some consultation with key stakeholders. This is detailed in Annex 3."</i> Please clarify what measures will be taken in the next monitoring period to assess this indicator.
Response by Project Proponent (round 1):
The project is increasing the number of its connections and with time, more costumers will be covered. In order to determine the sustainable development of the project, a survey will be carried out using questionnaires next year (2011) to collect qualitative and quantitative data on impacts the project has had on their life. The result of this exercise will be included in the next monitoring report.
Response by GS (round 1):
Request closed. <u>Forward Action Request</u>: please make sure to provide the survey report together with the next Monitoring Report.

Conclusion – The GS opinion is that: 1064 CO₂e (July 14th, 2007 June 30th, 2010) VERs can be issued by Gold Standard after the above clarifications and corrective actions

have been taken care of in a satisfactory way and as long as no further requests are raised during the two-week verification review period.